

WHAT IS CLAIMED IS:

1. A slider, comprising:
  - a substrate, having a first coefficient of expansion responsive to a stimulus;
  - a transducer tip disposed on the substrate, the transducer tip having a second coefficient of expansion responsive to the stimulus that is greater than the first coefficient of expansion; and
  - a hydrodynamic surface comprising a responsive aeroelastic deposit having a third coefficient of expansion responsive to the stimulus that is greater than the first coefficient of expansion.
2. The slider of claim 1, wherein a height of the responsive aeroelastic deposit above a portion of the hydrodynamic surface increases as the responsive aeroelastic deposit expands responsively to the stimulus.
3. The slider of claim 1, wherein the responsive aeroelastic deposit shears as it expands responsively to the stimulus.
4. The slider of claim 1, wherein the responsive aeroelastic deposit bends as it expands responsively to the stimulus.
5. The slider of claim 1, wherein the stimulus, responsively to which the third coefficient of expansion is greater than the first coefficient of expansion, comprises heat.
6. The slider of claim 1, wherein the stimulus, responsively to which the third coefficient of expansion is greater than the first coefficient of expansion, comprises an electric voltage or an electric current.

7. The slider of claim 1, wherein the stimulus, responsively to which the third coefficient of expansion is greater than the first coefficient of expansion, comprises a magnetic field.
8. The slider of claim 1, wherein the stimulus, responsively to which the third coefficient of expansion is greater than the first coefficient of expansion, comprises electromagnetic radiation.
9. The slider of claim 1, wherein the stimulus, responsively to which the third coefficient of expansion is greater than the first coefficient of expansion, comprises humidity.
10. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a convergent channel.
11. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a channel wall.
12. The slider of claim 1, wherein the responsive aeroelastic deposit comprises an above-ambient pressure formation.
13. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a cavity dam.
14. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a cavity wall.

15. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a sub-ambient pressure formation.
16. The slider of claim 1, wherein the responsive aeroelastic deposit is comprised on a cavity surface of the slider.
17. The slider of claim 1, wherein the responsive aeroelastic deposit is comprised on a bearing surface of the slider.
18. The slider of claim 1, wherein the responsive aeroelastic deposit is comprised on a side surface of the slider.
19. The slider of claim 1, wherein the responsive aeroelastic deposit is comprised on a leading surface of the slider.
20. The slider of claim 1, wherein the responsive aeroelastic deposit is comprised on a trailing surface of the slider.
21. The slider of claim 1, wherein the third coefficient of expansion responsive to the stimulus is less than the second coefficient of expansion.
22. The slider of claim 21, wherein the responsive aeroelastic deposit is disposed adjacent to the transducer to form a convergent channel, comprising a cavity surface comprising the responsive aeroelastic deposit, and a channel wall comprising the transducer tip.
23. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a debris shield.

24. The slider of claim 1, wherein the responsive aeroelastic deposit comprises a landing pad.
25. The slider of claim 1, wherein the responsive aeroelastic deposit has a shape and position on the hydrodynamic surface such that an expansion of the responsive aeroelastic deposit, responsively to the stimulus, causes a roll of the slider to increase.
26. The slider of claim 1, wherein the responsive aeroelastic deposit has a shape and position on the hydrodynamic surface such that expansion of the responsive aeroelastic deposit, responsively to the stimulus, causes a pitch of the slider to increase.
27. The slider of claim 1, wherein the responsive aeroelastic deposit has a shape and position on the hydrodynamic surface such that expansion of the responsive aeroelastic deposit, responsively to the stimulus, causes a lift of the slider to increase.
28. The slider of claim 27,  
    wherein the slider faces an opposing surface defining a fly height of the slider measured from the opposing surface to the transducer tip; and  
    wherein the responsive aeroelastic deposit has a shape and position on the hydrodynamic surface such that expansion of the deposit toward the opposing surface, responsively to the stimulus, causes the fly height of the slider to increase.

29. A slider, comprising a substrate, a transducer disposed on the substrate, and a hydrodynamic surface that comprises:

- a substrate surface having a first coefficient of expansion responsive to a stimulus;

- a transducer tip of the transducer, the transducer tip having a second coefficient of expansion responsive to the stimulus that is greater than the first coefficient of expansion; and

- a means for altering a height of an aeroelastic feature of the hydrodynamic surface relative to both the substrate surface and the transducer tip, responsively to the stimulus.

30. The slider of claim 29, wherein the stimulus, responsively to which the means alters the height of the aeroelastic feature, consists of heat, an electric voltage, an electric current, a magnetic field, electromagnetic radiation, or humidity.

31. The slider of claim 29, wherein the means for altering the height of the aeroelastic feature consists of a convergent channel, a channel wall, an above-ambient pressure formation, a cavity dam, a cavity wall, or a sub-ambient pressure formation.

32. A data storage system comprising:

- a media surface;

- a head assembly suspended above the media surface; and

- a slider suspended from the head assembly at a slider fly height above the media surface, the slider comprising:

- a substrate, having a first coefficient of expansion responsive to a stimulus;

a transducer tip disposed on the substrate and extending therefrom to a transducer tip height, the transducer tip having a second coefficient of expansion responsive to the stimulus that is greater than the first coefficient of expansion; and  
a hydrodynamic surface, comprising a responsive aeroelastic deposit having a third coefficient of expansion responsive to the stimulus that is greater than the first coefficient of expansion.

33. The data storage system of claim 32, further comprising:

means for sensing a condition relevant for optimizing a fly height of the slider above the media surface; and

means for exerting the stimulus on the responsive aeroelastic deposit as a function of the condition.

34. The data storage system of claim 33, wherein the condition relevant for optimizing the fly height comprises mechanical disturbances.

35. The data storage system of claim 33, wherein the means for exerting the stimulus consists of an electric lead, an electromagnet, or an electromagnetic radiation source.

36. The data storage system of claim 32, wherein the responsive aeroelastic deposit is shaped to increase the lift provided by the hydrodynamic surface, responsively to the stimulus, such that the transducer tip height and the slider fly height both increase responsively to the stimulus at a rate that is substantially similar.

37. The data storage system of claim 32, wherein the responsive aeroelastic deposit is shaped to increase a lift provided by the hydrodynamic surface, responsively to the stimulus, such that the slider fly height increases responsively to the stimulus at a rate that is greater than a rate at which the transducer tip height increases responsively to the stimulus.
38. The data storage system of claim 32, wherein the responsive aeroelastic deposit is shaped to decrease the lift provided by the hydrodynamic surface, responsively to the stimulus, such that the slider fly height decreases responsively to the stimulus while the transducer tip height increases responsively to the stimulus.